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Factsheet

SWEET POTATO PRODUCTION GUIDE

(Revision of Factsheet "Sweet Potato", May 1980

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The sweet potato *(Ipomoea batatas L.)* is a vine-type plant native to Central and South America and belongs to the same family as the flower Morning Glory. When grown in a tropical climate, it is a perennial plant which produces edible storage roots throughout the year. These roots do not require a ripening or maturation stage in their development, thus as soon as a root reaches the desired size it is ready for harvest. It is this somewhat unique growth characteristic that allows the tropical sweet potato to be successfully grown as an annual crop in our temperate climate. A fast growing cultivar such as Georgia Jet will produce marketable size roots in as few as 90 days after transplanting; however, most cultivars require 100 to 120 days to produce marketable size roots. The average marketable yield of sweet potatoes grown along the north shore of Lake Erie has been 8 to 12 t/ha. The annual Ontario requirement for sweet potatoes is 6000 to 7000 tonnes and the vast majority are sold during the fall and winter months.

Figure 1. Field of sweet potatoes in Southwestern Ontario in mid-summer.

The low dry matter type of sweet potatoes normally grown for human consumption are often wrongly referred to as "yams". The true yam is from a different family of plants and is not commercially grown in North America. Sweet potato roots are rich in vitamin A, vitamin C and potassium and offer excellent nutritional value.

CLIMATIC REQUIREMENTS

Sweet potatoes should be grown in areas that receive at least 3000 Corn Heat Units per season.

SOIL TYPE

Sandy soils with relatively low levels of organic matter and clay content are best suited for the production of sweet potatoes. Good tobacco soils are excellent for sweet potato production.

CROP ESTABLISHMENT

Under the right conditions, sweet potatoes will flower and produce true seed; however, the normal method of establishing a crop is vegetative propagation via vine cuttings or transplants produced from "seed roots" saved from a previous crop. Growers may purchase transplants from a certified plant supplier or they may produce their own transplants from "seed roots" bedded in a greenhouse. Ideally these "seed roots" would be obtained from a certified sweet potato seed grower; until such time as a seed program is established in Ontario, the most convenient source of seed roots is the United States. Growers wishing to import their own seed root supply should apply for an import permit at least 6 to 8 weeks in advance of the anticipated entry date.

Small roots (30 to 50 mm diameter) may be saved from the previous crop for next year's seed; however, this practice increases the risk of disease and production of off-types.

GREENHOUSE PREPARATION

Sweet potato transplants are easily produced in a greenhouse. Various bedding media such as muck, topsoil and a number of commercial peat-based growing mixtures have all been used successfully. New peat-based media does not require sterilization, but all new muck or topsoil plus any previously used bedding media should be sterilized to minimize subsequent weed, disease, and insect problems. Steaming is generally considered to be the most effective means of sterilization. Steam heat should be applied to raise the temperature of the media to 82°C at a depth of 15 cm and to maintain this temperature for 30 minutes. After steaming, the beds can be raked out, levelled and a small amount of greenhouse fertilizer such as 4-30-8 at 20 kg/100 m^2 incorporated into the upper 2 cm.

BEDDING SWEET POTATO ROOTS

The bedding or sprouting of the seed roots should commence 6 to 8 weeks in advance of the first transplanting date. The exact timing is somewhat dependent on the greenhouse in question, the cultivar to be grown, and the degree of sprouting that has occurred during storage. Roots may be bedded directly out of storage on or about April 12; however, in an unheated greenhouse cool weather may result in chilling injury which in turn can significantly delay and/or reduce the number of transplants produced. An alternative method is to presprout the roots in a dark chamber or room held at 26 to 30°C and 85 to 90% RH for 2 to 3 weeks before bedding. Roots can then be bedded about April 30 with a much reduced risk of being exposed to chilling temperatures.

Figure 2. Seed roots being covered with media prior to application of a wire mesh.

Bedding is accomplished by spreading out the roots in a single layer on a 7 to 10 cm thickness of media or on the greenhouse subsoil so that they are not in direct contact one to the other (18 to 24 kg of roots/m^2). Next, spread enough bedding media so that the roots are almost covered over. On top of this place chicken wire or an equivalent type of metal or plastic mesh. The wire or plastic mesh aids slip pulling by holding the seed roots in the bed so that the smaller plants can develop and provide a second and third flush of transplants. When the transplants reach 15 to 25 cm in height they can be pulled from the mother root and are ready for transplanting in the field. With good quality seed and proper greenhouse management you should expect to obtain 25 to 35 transplants/kg of seed roots over a 15-day period.

Figure 3. Seed root with developing transplants.

GREENHOUSE MANAGEMENT

Control temperature and humidity in the greenhouse with ventilation. The optimum temperature range for plant growth is 26 to 32°C and temperatures above 38°C should be avoided. Provide sufficient water to keep the bedding media moist, but not wet. On a sunny day 2 or 3 waterings may be required.

SPRING TILLAGE

Plow down the rye cover crop and prepare the land as for any other transplanted crop (eg. tobacco or tomatoes).

CULTIVAR SELECTION

The work on cultivar evaluation is still on-going and many cultivars are yet to be evaluated. The following suggestions are based on work completed to date.

Yield is only one criteria and perhaps not even the most important criteria used in the selection of a cultivar. Root quality and market acceptability are also vitally important. In the past, the Ontario market has shown a strong preference for the copper skin + orange flesh type of sweet potatoes. Of this type, the cultivars Jewel, Cordner, and Topaz, have performed the best overall.

The red skin + orange flesh cultivars are well accepted by the U.S. consumers and by the Delhi Research Station quality evaluation panel. Of this type, the cultivars Georgia Jet, Resisto and Regal have performed the best. The grower is advised to check with his wholesaler or retailer before selecting one of the red skin types.

As is the case with all fresh vegetable production, it is very important to known your market. If your crop is to be marketed successfully, it must meet all the industry standards for quality. For example, root size and shape must be within specified limits and even within these limits size grading is desirable. In addition, skin and flesh colour must be acceptable; roots must be clean and packaged in suitable containers and roots must be delivered on time and in quantities that meet the purchasers' requirements. These are some of the more obvious and traditional quality standards for fresh-market sweet potatoes; there may be more and failure to meet any one quality standard may greatly reduce or even eliminate product demand.

FUMIGATION

The evidence to date indicates that the root-lesion nematode *(Pratylenchus penetrans),* which is the most common nematode in this area, is not a significant parasite of sweet potatoes. Fumigation to control these nematodes is not considered necessary.

TRANSPLANT DENSITY

Select a row spacing that is compatible with your harvesting equipment. A 1.25 m spacing between the rows is suitable for our equipment and has proven satisfactory on area farms. The spacing between plants in the row should be no closer than 30 cm and no greater than 60 cm. Adjust the in-row spacing to produce a transplant density of 13000 to 16000 plants/ha.

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FERTILIZATION

The following guidelines for the fertilization of sweet potatoes are based on practices followed at the Delhi Research Station. Calibration trials to establish the fertilizer requirements based on soil analysis and crop needs have not been done.

A. Nitrogen

Relatively little nitrogen fertilizer is required especially if the sweet potatoes follow a plow-down rye cover crop. Use about 30 kg N/ha.

B. Phosphorus

With soil test values of 60 ppm P_2O_5 or greater, which is quite common on tobacco land, there is not likely to be a response to additional phosphorus. If your soil test shows a lesser amount of phosphorus, then 30 to 60 kg P_2O_5/ha may be applied at transplanting.

C. Potassium

Potassium is required in relatively large amounts as the roots contain about 1.5% K on a dry weight basis. Use 120 to 180 kg K_2O/ha.

CULTIVATION

Cultivation is necessary to control weeds as herbicides are not yet registered for use in Ontario. In addition to cultivation for weed control, hilling the rows makes the fall digging operations much easier. The hill should be formed before storage roots are initiated and before the vines spread so much that they are in the way. A hill 15 cm high and 30 to 40 cm wide should be formed about the third week of June.

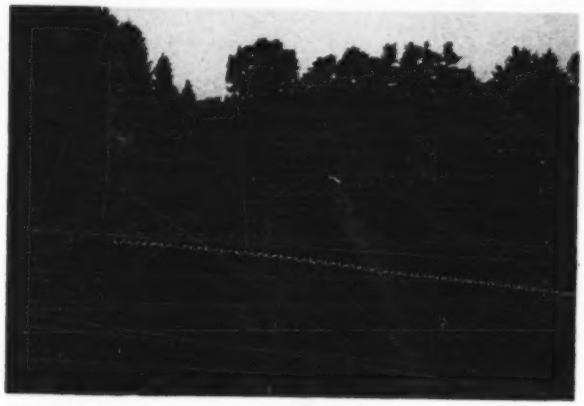

Figure 4. Hilled sweet potatoes in early summer.

IRRIGATION

In general, sweet potatoes are very drought tolerant and reasonable yields are possible without irrigation.

INSECTS

Research to date has not identified any significant insect pests in Ontario grown sweet potatoes. There are no insecticides registered for use on sweet potatoes grown in Ontario.

DATE OF HARVEST

Only very minimal increases in yield have been observed past mid-September and none past September 30. The risk of injury from exposure to chilling temperatures increases greatly during late September and early October. Chilling may occur at soil temperatures as high as 8°C depending the cultivar and length of exposure. Chilled roots often appear perfectly sound when first dug, but decay very quickly during curing or the first few weeks of storage.

HARVEST

None of the diggers observed to date are capable of operating satisfactorily unless the vines have first been removed or chopped into small pieces with a flail mower. Mow or remove the tops 2 to 7 days before harvest.

The roots are very easily damaged. Scuffing off the skin leaves unsightly scars and bruising tends to result in a sunken discoloured areas or complete decay. In general, it is necessary to operate the digger more slowly than is required for regular Irish potatoes and to handle the roots much more gently — be especially careful of bruising.

Figure 5. Harvesting sweet potatoes.

Some sorting or grading is required in the field unless you are willing to cure and store the total yield of which nearly one-half maybe unmarketable as table stock. Roots should not be washed or unnecessarily handled until just before shipping as these operations tend to significantly reduce the roots shelf-life.

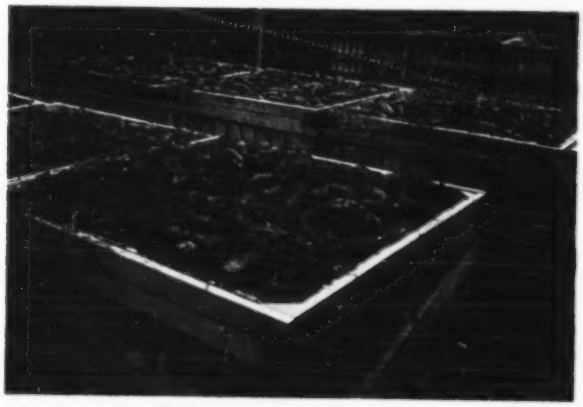

Figure 6. Field crates of sweet potatoes fresh from the digger.

CURING

Curing is required if roots are to be stored for more than 10 days after digging. The curing process allows the wounds resulting from the digging and handling procedures to heal over and greatly extends the shelf life of the roots. Roots should be placed in the curing environment on the same day that they are dug and maintained at 25 to 28°C and 85 to 90% RH for 3 to 5 days. Air flow and ventilation is required to limit the build up of heat; carbon dioxide and/or ethylene and to prevent the depletion of oxygen. Consult a storage engineer for appropriate storage design.

STORAGE

After curing, the roots should be stored at 14 to 16°C and 85 to 90% RH. Non-freezing temperatures at or below 10°C can result in chilling injury and temperatures above 16°C can result in excessive sprouting. A low relative humidity causes the roots to lose moisture and become soft, rubbery, shrivelled and unmarketable.

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